# Chapter 7 - Trees

## 7.1 Purpose

The 20,000-acre King County Park System nurtures many native and ornamental trees in formal landscapes and natural settings. It also protects many parcels of undeveloped natural areas acquired for future development or habitat. Natural areas harbor primarily native trees that are remnants of the Puget Sound and Cascade forests.

The health of this tree collection is a major indicator of the health of our urban and suburban ecosystems. Until recently, Parks paid insufficient attention to developing policies for the use and replacement or reforestation of these areas. This section identifies BMPs for ensuring the health of our urban and suburban forests. Much of the success of salmon recovery efforts depends on enhancing the quality of our watersheds, woodlands and sensitive areas.

## 7.2 Definitions

**Crown:** portion of plant (generally a shrub or tree) where it emerges from soil.

**Derelict tree:** any tree in such poor condition no reasonable restoration is possible.

**Habitat tree:** any tree that has declined in a manner to be derelict but has habitat value and is allowed to remain in park. Unlike a hazard tree, a habitat tree has no target.

**Hazard tree:** any tree with a target (should it or a portion of it fall) and a reasonable probability of failure.

**Transpiration**: process of expelling water vapor and carbon dioxide that all plants do partially to aid in cooling, very similar to mammals sweating.

## 7.3 Background

The King County Park System contains thousands of enormously valuable trees. These trees and forests are long-term investments we manage in locations ranging from open turf and shrub beds to major trail systems, wetlands and forests. Physically, park trees clean the air, reduce urban runoff, modify temperature, and serve as wildlife habitat. Aesthetically, trees lend form and structure to park settings.

## 7.4 Design

The following design considerations enhance both the aesthetic and ecological value of trees:

### Selection

Selecting trees that adapt well to their site and fulfill their landscape function is extremely important to a successful planting. The quality of young plants is also crucial. A plant species should be selected on a basis of its functional uses, its adaptation to the site, its resistance to diseases and other pests and the amount of care it will require. The following table shows landscape classifications and our differing objectives for tree care:

| King County Park System Tree Classification and Practice | |
|---|---|
| **Class** | **Practice** |
| Formal areas | • Require more frequent maintenance than those in natural areas.<br>• Create risk because of greater likelihood of tree and people interaction.<br>• Suffer greater incidence of mechanical injury<br>• Demand greater restriction on design |
| Informal (natural areas) | • Get grouped together as part of a forest, rather than as a single tree.<br>• Experience greater impacts from competing invasive, exotic plant species, like English ivy and Himalayan Blackberry.<br>• Include trees deep within the woods, those in natural areas, those in natural or created openings and those on forested edge.<br>• Many trees in natural areas abut private property and therefore have a greater risk potential. |
| Streets, Boulevards, Trails | • Require greater frequency of maintenance than in parks and natural areas because of proximity to people and property and harsh growing conditions.<br>• More likely to suffer from restricted root space, construction damage, mechanical injury and other related people pressures.<br>• Management directly impacts adjacent property owners and users of the facility. |

## Tree Landscape Functions

- Architectural features: privacy, view enhancement, and space articulation
- Engineering: reduce glare, direct traffic, filter air, reduce soil erosion, and reduce noise
- Climatic influences: transpiration effects on cooling; interception of solar radiation, reflection, and re-radiation; and modification of rain, fog and snow deposition
- Aesthetic uses: size, form, color and texture.

## Site Adaptation

**It is very important to plant the right tree in the right place**.

Intended use and nature of a site should be considered when selecting trees.

Growth habit and ultimate size are important considerations—a tree should not outgrow its space. Roots should not invade or damage park assets. The table on the next page gives design standards for selecting trees:

| Design Standards for Trees in King County Park System | |
|---|---|
| **Trait** | **Comments** |
| **Growth Rate** | Fast-growing trees can tolerate difficult sites. If neglected, they become weak wooded, subject to limb breakage, and short lived. |
| **Wood Strength** | Branch structure and wood strength are closely allied. Conifer branches shed snow easily and partially compensate for weak wood. Black cottonwood trees shed branches with no outward signs of weakness. |
| **Rooting** | Roots provide anchorage, nutrients and water. Shallow soils, soil texture interfaces, rainfall and irrigation all cause shallow rooting and drought stress. Trees with invasive roots hurt sewers and drain lines. Surface-rooted trees sucker heavily when injured and raise pavement. |
| **Tree Features** | **Leaves:** color, size, shape and persistence. Avoid near pools and tennis courts.<br>**Thorns and prickly foliage:** enhanced security vs. increased maintenance and safety problems.<br>**Flowers and fruit:** aesthetic consideration, wildlife habitat, potentially increased maintenance. Can attract rodents. |
| **Climatic Adaptation** | Plant hardiness and locale zone<br>**Moisture:** natural or irrigated.<br>**Light:** reflected or interrupted.<br>**Wind:** deflect or channel wind patterns. |
| **Soils** | Poor soils can cause failure of plantings. Amendment may not be desirable or feasible. Match plant to poor soil conditions. |
| **Air Pollution** | Choose trees with appropriate tolerance levels. |

| | |
|---|---|
| **Pest Resistance** | Resistant plant material reduces maintenance. |
| **Native Plants** | Select hardy, native plant material that thrives in current climates and provides diverse habitat and low maintenance. |
| **Selecting Quality Stock** | Selection of quality stock is as important to success as selection of proper species, planting and maintenance. Root and shoot quality affect performance and survival. |
| **Root Defects** | Kinked or girdling roots eventually "choke" a tree. |
| **Top and Trunk Characteristics** | Height-to-caliper ratio.<br>Crown configuration.<br>Branching pattern. |

## 7.5 Maintenance Practices

The following are BMPs for routine maintenance of trees.

### Planting

- Ideal planting time is October through March.
- Create an ideal planting hole: 3 times diameter of root spread on bare root or root ball.
- Use a minimum planting hole 12 inches wider than root spread or root ball.
- Planting hole must be no deeper than root ball. Root ball must fit firmly on undisturbed subsoil.
- Native soil must be used to backfill planting hole. An exception is a situation in which existing soil is either contaminated or filled with rubble or pure clay.
- Tree must not be fertilized at time of planting.
- Balled and burlapped (B&B) trees must be placed in hole and plumbed vertically. Do not pull tree by the top to position it. All rope must be removed from around trunk. Top half of burlap must be removed by cutting it away. Trees in wire baskets must have the top half of basket removed. Use bolt or wire cutters to expose top 12 to 18 inches of root ball.
- Do not remove any B&B packaging material until tree is placed in hole and securely plumbed into final position.
- Backfill soil in lifts of 4 to 6 inches at a time with compaction of each layer. Do not compact muddy backfill. Water thoroughly after backfilling to settle the soil, eliminate air pockets and re-wet the root system.
- Watering in the soil is preferred over compacting. Backfill half of soil in tree pit. Thoroughly drench with water to settle. Complete back filling. Thoroughly drench again with water. This method removes air pockets and settles soil.

- Trees planted in sandy or loamy soils should have a 3-inch-high berm erected just past the perimeter of the planting hole. Berms retain water and funnel it to the root ball. Berms should not be constructed in clay or in sites with heavily compacted soils.
- Mulch all trees with 3 to 4 inches of shredded mulch or compost immediately after back filling.
- Mulch should extend past diameter of tree planting hole, at least 6 inches, or to all sides of tree ring.
- Maintain 3 to 4 inches of mulch annually.
- Keep mulch away from tree trunk. Taper mulch from the 3-inch depth back to grade right at the trunk to avoid decay of bark tissues.
- Water newly planted trees weekly through the first growing season.
- Trees should receive approximately 1 inch of water per week including rainfall.
- Remove or suppress weeds within mulch ring to eliminate competition and for aesthetics in formal plantings.
- Weeds and/or turf should not be allowed to grow up to the tree trunk at any time. This increases the likelihood of mechanical injury.
- Stake only in situations where normal planting procedure does not provide a stable plant. The following are non-normal plant situations that require staking:
    - As a vandal deterrent.
    - Tall height-to-root spread.
    - High wind areas.
    - Areas in which mower or trimmer injury could occur.
- **Remove stakes and ties at end of first year.**
- Remove tree trunk wrapping materials and tags.
- Do not wrap tree trunks.

## Natural Area Planting

- Determine which tree should be planted where.
- Prepare the site by scalping all vegetation in a 4-by-4-foot area.
- Clear the area to bare soil.
- Plant the tree as described above in the center of the scalped area.

- Maintain the 4-by-4-foot area free of competing vegetation for 3 years.
- Flag each new tree on a branch, not the main trunk, for visibility, so that new trees can be located for watering.
- Depending on tree size and location, stake for stability.
- Water newly planted trees immediately after planting. Water all new trees during summer drought stress periods as needed for first one to two establishment seasons.
- Re-apply mulch to cleared /scalped areas after first year's establishment to encourage water retention and suppress weeds.

## Container/Bare Root Planting

- Remove container from plants before placing in planting pit.
- Tease pot-bound roots with hands or small tools before final placement in planting pit.
- Bare root plants must be protected from root drying before and immediately after planting.
- When possible, soak bare roots before planting.
- Exceptionally long roots must be cleanly pruned to create a uniform root mass.
- Take care to plant bare rootstock at the same grade as grown in the nursery.

## Tree Pruning

### Deciduous Trees

- Pruning for health: All broken, dead and diseased limbs and branches must be removed back to healthy viable wood.
- Crossing and misshapen limbs and branches must also be removed as soon as possible.
- Narrow crotches must be eliminated by removing or drop pruning one of the competing scaffold limb when as small as possible, to reduce splitting later.
- Trees located in lawn areas or in areas where people may walk must be pruned to establish the crown at least 8 feet above ground. This practice eliminates eye hazards to park users. Along roadways and trails a 14-foot clearance is required.
- Pruning cuts must be made cleanly with sharp sterilized tools. Use rubbing alcohol, or 3 to 1.
- Cut side branches ¼ inch away from trunk for every 1 inch in diameter of removed branch. Cuts should be almost parallel to trunk and to branch cambium roll indicators (concentric rings in the branch collar). Support the portion being removed or take the leader off in stages to avoid tearing bark.

- If the main leader must be removed, prune back to a major side scaffold branch. Pruning cut should be ¼ inch per 1 inch of diameter of trunk removed above the side scaffold branch. The cut must parallel to the angle of side scaffold. Do not apply wound dressings except as pest protection from borers.

- Dispose of any diseased wood. Do not use for composting.

## Coniferous Trees

- Needled evergreens usually do not require pruning except for health.

- Remove any dead, broken or diseased branches. Use the guidelines above for making pruning cuts.

- Allow the tree to remain dressed to the ground, unless it may cause sight line or safety concerns.

- It is especially important to cut back to a viable branch or the trunk because evergreens usually do not re-sprout without green foliage remaining.

- Taking out the leader or cutting it back is usually bad practice. In conifers this causes weak scaffold connections that later fail.

### Specialized Pruning and Tree Work

- Stylized pruning, shaping and pollarding is not done unless a tree is in a special or historical setting that requires it.
- Cabling and bracing is not done unless the tree is highly valuable or needs it for extraordinary reasons.
- Cavity filling is not done.
- Root pruning is not done except for safety. If pruning is necessary, assess tree stability.

### Tree Removal

- Derelict trees that cannot be made safe or functional by corrective pruning must be removed.
- A tree must be defective and have a target to be considered a hazard.
- Hazard must be the first determining factor in removal consideration.
- Trees may present a risk because of old age, storm damage, poor structure, disease, decay or death.
- Trees that constitute a high hazard must be removed.
- Tree decline or failure is caused by several factors. These include poor tree structure, summer branch drop, increased exposure, root loss, unstable rooting, girdling roots, leaning trees, unfavorable soil conditions, cracks, conks, seams, decay, cavities, root rot and butt diseases.
- Trees may occasionally be removed for new park construction, access or other issues not related to tree viability.
- If trees are smaller than 12 inches in diameter, they can be transplanted—if cost-effective.
- Tree removal is a sensitive issue. It is important to alert park management and if necessary participate in a public process to allow for comment.

## 7.6 Cultural Care

The following are BMPs for growing, healthy long-lived trees.

- Do not give supplemental watering to established trees except during extreme drought.
- Modify turf irrigation around established trees to accommodate water requirements of the trees.
- Keep spray from large sprinklers away from trees to avoid water-caused abrasion and constant moisture on trunk, which can lead to decay in some species.

- Avoid fertilizing ornamental and native trees, unless symptoms indicate a need for fertilizer.

## 7.7 IPM

### Thresholds

The following are IPM thresholds for trees.

#### Insects

The King County Park System does not actively control insect pests in trees. The following measures are to be occasionally used when insect pests need to be controlled:

- Trees prone to damage from insects should be removed and replaced with a more resistant species. For example, Blue Spruce is prey to spruce aphid, which causes massive needle drop. Where repeated infestations disfigure trees, consider removal and replacement with more resistant species.

- Insect pests like tent caterpillar and fall webworm should be physically removed.

- Insecticides may be used in very rare cases where significant value or historical trees are involved. Care should be taken to consider physical drift of the agent.

### Disease

The King County Park System does not control diseases in park trees, except by excising diseased wood through pruning or removal of the tree. This practice, however, would be reconsidered when highly valued; diseased historic trees are in question.

### Physical Damage to Trees

Physical damage to trees is a major factor in overall tree loss. This damage occurs in several ways:

- When trees are repeatedly struck by mowing equipment or string trimmers

- When park users abuse trees

- When development opens adjacent private land and exposes trees to wind throw or breakage. In some areas of the County, especially on the Enumclaw and Pine Lake plateaus, regular high winds or non-normal wind direction storms cause blowdowns and major limb breakage.

The following IPM controls reduce damage to trees:

- Remove turf from around tree base to create a vegetation-free tree rings 3 to 4 feet in diameter. The tree ring allows adequate space for mowing.

- Thin trees or limbs along the perimeter of parks where adjacent clearing has occurred. This practice reduces blowdown and edge effect.

## 7.8 Training

All park resource field staff should receive training on basic tree maintenance, tree problem diagnosis, and tree hazard identification.